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Battling SARS: New SARS Treatment To Be Tested in Beijing --- Animal Experiments Are First Step in Bringing Drug To Patients, Scientists Say

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A promising new treatment being developed to fight the deadly SARS virus will take an important step forward today when AIDS researcher David Ho meets with the Chinese Academy of Medical Sciences in Beijing to design experiments involving animals.

The treatment, developed by Dr. Ho and a group of Hong Kong researchers, involves compounds called peptides that, in test-tube experiments, prevented the SARS virus from infecting cells. The peptides are believed to be the first that were designed specifically to attack SARS, according to scientists involved in the research.

Dr. Ho and Malik Peiris, co-head of the team battling severe acute respiratory syndrome at the University of Hong Kong, caution that laboratory results, however promising, are just the first step in bringing a drug to patients. But even if these peptides never end up as actual medicine, how they came this far this fast is an extraordinary demonstration of scientific creativity and drive.

"It was quite exciting to see a couple work exactly as predicted," said Dr. Peiris. "It's an indication of how quickly events are moving in terms of finding the virus, finding the genetic sequence and progressing from there to get to selective targets in the virus that can be inhibited, to block virus replication."

The peptides that Dr. Ho developed work by blocking the SARS virus from fusing to human cells, one of the first steps in infection. Peptides are synthetic proteins, made of amino acids, and they have been used to fight other viruses. Roche Holding AG's drug Fuzeon, for example, works against HIV, the virus on which Dr. Ho made his name.

In early April, Dr. Ho, who says he had been watching SARS avidly because it is "a fascinating epidemic," was invited by Hong Kong Chief Executive Tung Chee Hwa to consult on the virus. About a week later, as Dr. Ho was driving to work in New York, he heard on the radio that the genetic sequence to the SARS virus was going to be available. He and Linqi Zhang, a staff researcher at the Aaron Diamond AIDS Research Center, which Dr. Ho runs, immediately tried to get the sequence, but couldn't. In frustration, Dr. Zhang was phoning the databank that was supposed to post the sequence when it popped up on his computer.

Just five hours later, recalls Dr. Zhang, he came to Dr. Ho and said, "This is where we can contribute."

That speed didn't just happen by luck. Dr. Ho's lab has been studying the envelope of HIV -- the outer sheath of the virus that attaches to cells -- for years. Once SARS hit, Dr. Ho had also been reading up on coronaviruses, of which SARS is one. Indeed, Dr. Ho and Dr. Zhang were looking for something very specific on the envelope of the SARS virus -- a coiled structure that pulls the cell membrane and the virus membrane together so that they can fuse. Specifically, they were looking for a "heptad repeat," which is a repetition in the amino-acid sequence that occurs every seven amino acids and gives the protein its coil structure. When they found it, Drs. Ho and Zhang knew they could design peptides to interfere with it, because that is how the HIV drug Fuzeon works.

Essentially, fusion inhibitors are decoys that look very similar to part of the virus itself. In order for the SARS virus to fuse with the cell, the virus undergoes a complex process in which one part of its envelope, called HR1, interacts with another part, called HR2. The decoy peptides that Dr. Ho developed bind to either HR1 or HR2, stopping them from interacting with each other, and thus blocking the virus from fusing to the cell.

So at that stage, Dr. Ho's team started designing possible peptides. Dr. Ho also feverishly looked for a commercial lab that could actually produce and purify them quickly. He found a company in California, which he declines to name because, he says, he doesn't want it to be flooded by calls as it continues work refining the current peptides and new ones.

The company, says Dr. Ho, managed to make 12 peptides, some in as few as 10 days -- a remarkable feat given that the process usually takes weeks or even months.

Meanwhile, Dr. Ho had flown to Hong Kong to present his idea to Dr. Peiris and his research co-head, Yuen Kwok-yung. Dr. Peiris says he had also noticed that SARS fused with cells in a similar way to HIV and so was happy to collaborate.

The next step will be to test the peptides in animals, which Dr. Ho says will probably take place in China, because that is where "the urgency is." The SARS epidemic, he says, has been "quite a wake-up call for China, in terms of the importance of health, of emerging infections, and of the impact of a medical crisis on society and the economy. It's also a wake-up call that they have to have a proper structure to deal with such things."

Karen Richardson contributed to this article.

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